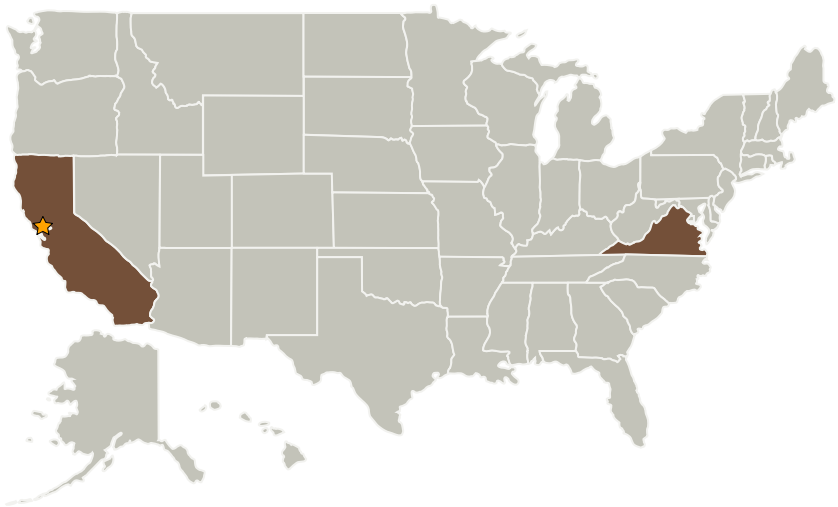
Robust Decision Support Technology, Phase I

Completed Technology Project (2004 - 2004)

Project Introduction

A fundamental challenge in the development of automation to aid a human user, and a primary metric for the success of the design, is acceptance by the user community. This is particularly true of air traffic control (ATC) automation. The proposed work hypothesizes that a lack of robustness to uncertainty leads to automation designs that are not human-centered and, therefore, are unacceptable or unusable to the users. Automation must frequently provide advisories, make control decisions, or alert in the presence of uncertainty about the state of the world. Contemporary automation typically bases outputs on deterministic estimates, discarding available knowledge about uncertainty because techniques for using this knowledge in the automation?s algorithms or displaying uncertainty information to the user are not available. The proposed work studies two approaches to handling uncertainty. First, we will investigate automation designs that incorporate knowledge of uncertainty in the automation?s calculations and decisions. Second, we will investigate presenting confidence/uncertainty information to the user. Finally, we will evaluate how these approaches to incorporating knowledge about uncertainty improve the usability and acceptability of decision support tools. We will study this problem in the context of ATC automation.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Metron Aviation, Inc.	Supporting Organization	Industry	Dulles, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Stephen Atkins

Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.3 Simulation
    - TX11.3.6 Uncertainty Quantification and Nondeterministic Simulation Methods